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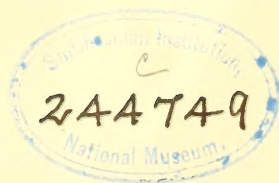


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Lockington, William N.

Crustacea. (Binder's title).

INVERTEBRATE
ZOOLOGY
Crustacea



Remarks on the Crustacea of the West Coast of North America, with a Catalogue of the Species in the Museum of the California Academy of Sciences.

BY W. N. LOCKINGTON.

CANCROIDEA.

Family CANCRIDÆ. Sub-Family CANCRINÆ.

No new species of this sub-family appears to have been found since Stimpson described *Cancer antennarius*.

Cancer magister. Dana. U. S. Ex. Exp., I, 151, pl. VII, fig. 1. Stimpson, Crust. and Ech. Pac. S. N. A., 18; Proc. Cal. Acad. Sci., 1, 88. *Cancer irroratus*. Randall (not Say.) Lockington, Proc. Cal. Acad. Sci., 1876.

The localities given by Stimpson for this abundant species range from Sitka to Monterey, and I have two young specimens among miscellanea, collected at Magdalena Bay, Lower California.

No. 25. San Francisco market, dried, male. W. N. Lockington.

Cancer gracilis. Dana. U. S. Ex. Exp., I, 153, pl. VII, f. 2. Stimpson, Proc. Cal. Acad. Sci., 1, 88; Crust. and Ech. Pac. S. N. A., 20.

The only specimens I have yet seen are those in the museum of the Cal. Acad. Sci.

No. 26. Two females, dried. Locality unknown.

Cancer productus. Randall. J. A. N. S., Phil., VIII, 116. Dana, U. S. Ex. Exp., I, 156, pl. VII, f. 3. Stimp., Proc. Cal. Acad. Sci., 1, 88. *Platycarcinus productus*. Gibbes. Proc. Am. Asso., 1050. p. 177. Stimpson, Crust. and Ech. Pac. S. N. A., 21.

This species has been found at Puget Sound, Tomales Bay, S. F. Bay, San Diego, and Magdalena Bay, L. C.

No. 27. Several young specimens from Monterey, dried. Dr. J. G. Cooper.

No. 28. Young, dried. San Diego. Hy. Hemphill.

No. 40. Male, in spirits. S. F. Bay. W. N. Lockington.

Not only are the young of this species very different in appearance from the adult, but they are so variously striped and marked that a superficial examination might cause them to be considered the young of several distinct species. The specimen described by Dana was not fully grown, and, like all the immature specimens I have seen, had the teeth of the produced front low and like lobes, with a short suture on the carapax between each lobe and the next. In the adults, the teeth of the front are more separate and more acute, and the central tooth more produced than the lateral ones; moreover, the nine antero-lateral teeth are distinctly separated from each other, and the body near the antero-lateral margins is thicker than in the young.

The prevailing color of the adult is red, becoming darker and more brownish above, and orange or yellowish below. Among four young ones found under stones at Monterey, two are chocolate, with a somewhat darker tint on the elevated parts of the carapax; a third, bright yellow, with irregular blotches of dark red; and the fourth, yellow, with narrow red stripes, giving it a zebra-like appearance.

An examination of young and adult specimens only would lead to the belief that they were distinct species, but a full series of specimens, of all sizes and ages, reveals their specific identity.

This species is common in the bay of San Francisco, but I have never found either it or its young beneath the stones on the beach, as is the case at Monterey. In April of this year, half an hour's search under the stones at Preston's Point, Tomales Bay, procured me twelve fine adult specimens, all or most of them females. I did not observe any ova attached to them, and I

thought it singular that on a second visit paid to the spot in July, I could not find a single female, though at low tide mark I secured an overgrown male who had lost too many limbs to retreat with sufficient quickness.

Cancer antennarius. Stimpson. Proc. Cal. Acad. Sci., I, 88; Crust. and Ech., Pac. S. N. A., 22.

No. 29. Female, dried. Probably from San Francisco Bay. Wm. Stimpson. (?)

No. 39. Young, between tides. San Diego. Hemphill.

No. 41. Female, with ova. S. F. Bay. W. N. Lockington.

This species appears to frequent deeper water than *C. productus* or *C. magister*, as, though occasionally taken on the lines of the anglers in San Francisco bay, I have never known of its occurrence on the beach between tides. It is found on the ocean shore near Tomales, and occurs as far south as Magdalena Bay, Lower California, where a fine specimen was obtained by Mr. W. J. Fisher.

The sides of the chelipeds are beautifully marbled with dark spots upon a lighter ground in adult recent specimens.

Sub-Family XANTHINÆ.

Until very lately not a single representative of this sub-family had been found upon our western shores, probably because the the first collections were made in the neighborhood of San Francisco.

The species named by Stimpson and Dana were collected at various localities from Monterey northward to Sitka, but the coast southward from the former place to Cape St. Lucas, and the shores of the Gulf of California, have been, and still are, comparatively unknown to carcinologists.

All the species of *Xanthinæ* described or mentioned in these notes have been collected in the last mentioned localities by Mr. Hy. Hemphill and Mr. W. J. Fisher.

Those species which I have previously described from single specimens furnished to the Academy by the former collector are most of them more fully known to me by numerous specimens obtained by the latter during five months spent in dredging and collecting along the uninviting shores of Lower California, while those which are new are in every case the results of the same indefatigable collector's labors.

It is somewhat singular that, so far as I am aware, not a single species of this sub-family has yet been found along the shores of Northern California, Oregon, or Washington Territory, and I cannot avoid thinking that further search may disclose some.

The genus *Panopeus* is represented on the shores of Central America by two or three forms which have not hitherto been found so far north as Lower California.

I own myself unable to perceive any sufficient reason for the separation of *Xantho* from *Xanthodes*, but I have relegated two of the narrowest forms to the latter group.

rotundatus St
Atergatis cristatissimo. Lockington. Proc. Cal. Acad. Sci., March 20, 1876.
 La Paz, San José Island, Amortiguado Bay.

This pretty little species does not appear to occur on the west coast of Lower California.

The color of the carapax in spirits is the same as in the dried specimen, viz., bright red.

No. 30. Two males, dried. From La Paz. D. E. Hungerford.

No. 42. Male and female, in spirits. W. N. Lockington.

Labyrinthica St
Actaea meandricus. nov. sp.

Front four-lobed, antero-lateral margin without conspicuous teeth; postero-lateral margin highly concave.

Entire upper surface of the carapax covered with involved rugæ; those of each areolet distinct; areolets separated by sulci.

Chelipeds equal, their upper outer surface rugose like the carapax, the rugæ giving way to rows of tubercles on the underside of the manus.

Upper edge of the manus and carpus an acute angle; inner surface of both perfectly smooth; meros smooth on both sides, compressed.

Hinder limbs with compressed joints; the meros smooth on both sides, except in the fifth pair; the remaining joints rugose on their upper and posterior aspects. Meros of fifth pair rugose above. Fingers of chelipeds sulcate, short. Sternum cavernous; abdomen with transverse rugæ. Color, in spirits, dull red.

Locality, Mulege Bay, Gulf of California.

Two specimens, a male and female, are all I have seen of this well marked species.

	♂	♀
	M. M.	M. M.
Greatest length.....	20	19
Extreme width of carapax.....	27	25

This little crab has a peculiarly compact appearance. The rugosities of its limbs are so arranged that when they are folded up close to the carapax not a portion of smooth surface can be seen either above or below, the only smooth portions being lateral and hidden.

Heteractaea. nov. genus. *Belongs to Plumnus*

Form of carapax as in *Actaea*, but with an external hiatus to the orbit, and its lower margin divided into two lobes. Abdomen of male, five-jointed.

I am loth to form a new genus for a species which resembles an *Actaea* so closely in its general aspect and form, which, in my belief, afford far better evidence of the real affinities of any animal than are afforded by variations in the form of the orbit or the length of the basal joint of an antenna; but I have no choice in the matter, as the genus *Actaea* is defined as "without an external hiatus to the orbit," while the genera with the lower margin of the orbit divided into teeth have a seven-jointed abdomen in the male.

Heteractaea pilosus. nov. sp. *Plumnus lunatus*. Edwards & Lucas

Aspect that of an *Actaea*, but the orbit with an external hiatus, and its lower margin divided into two separate lobes. Front two-lobed, upper mar-

gin of orbit a long thick, sinuate tubercle. Teeth of front, upper and under margins of orbit, and a small tooth just external to the outer hiatus of the orbit, red, smooth, shining, and naked. The remainder of the upper surface of the carapax thickly tomentose. Antero-lateral margin with three sharp teeth projecting beyond the tomentosity. Regions of carapax distinct. Chelipeds tomentose, the carpus and manus covered with tubercles arranged in regular series on the outer side of the manus. Right cheliped larger than left; fingers sulcate. Tubercles of manus and carpus red, the red predominating at the distal end of the manus. Longer hairs scattered at intervals among the tomentosity of the carapax; hinder limbs thickly pilose.

Localities, San José Island, Amortiguado Bay; and Port Escondido, both in the Gulf of California.

Several specimens. The largest pair measure as follows:

	♂ M. M.	♀ M. M.
Greatest length.....	19	15
Greatest width.....	27	20

No. 43. Male and female, in spirits. Fisher and Lockington.

Xantho tenuidactylos. nov. sp.

Front declivous, antero-lateral margin without distinct lobes or teeth, thick; anterior portion of carapax somewhat hexose, granulate; carpus and manus thickly covered with large granulations above and externally, the granulations extending on to the upper and outer surface of the fingers; fingers sulcate, those of the right cheliped (which is the larger) rather short; those of the left cheliped exceedingly long and thin. Hinder legs somewhat tomentose.

Color reddish-brown; fingers black.

One specimen only, a female, taken at low tide, on the flats at La Paz, Lower California.

	M. M.
Length of carapax.....	15
Width of carapax.....	11

Xantho grandimanus. nov. sp. *Ozius Verreauxii* Sars

Carapax transverse, antero-lateral angles not prominent. Front four-lobed, the central emargination running back as a deep sulcus across the frontal regions of the carapax. Upper margin of orbit tumid, backed by a deep sulcus, giving off at a right angle, a sulcus separating the median from the lateral regions of the carapax. Antero-lateral teeth, five; the first two long and low; third low, but somewhat shorter; fourth much shorter and pointed; fifth very small. Areolation indistinct; frontal and antero-lateral regions granulated. Right cheliped very large, smooth, meros hollowed out throughout its posterior upper surface so as to fit closely to the under surface of the carapax; carpus large, heavy and rounded; manus broad, rounded above and without crests or tubercles; movable finger with a very large tubercle at its inner base; fixed finger with three or four tubercles. Left cheliped similar, but much smaller; fingers much smaller proportionately to the manus than

in the larger cheliped; fingers with numerous tubercles on inner surface. Hinder limbs rounded; the two last joints tomentose.

Color reddish-brown; fingers slaty.

Locality, La Paz, L. C.

The dimensions of a large specimen of each sex are as follows:

	♂ M. M.	♀ M. M.
Greatest width of carapax.....	71	60
Greatest length of carapax.....	50	41
Length of larger hand.....	65	50
Length of smaller hand.....	47	39
Greatest width of larger hand	27	22

No. 31. Male and female and young. Identity of donor unknown.

dentatatus St
Xantho multidentatus. Lockington. Proc. Cal. Acad. Sci., Feb. 7, 1876.

No. 38. Male, dried. Mazatlan. Hy. Edwards.

PARAXANTHUS.

willata St
Xantho novem-dentatus. Lockington. Proc. Cal. Acad. Sci., Feb. 7, 1876.
San Diego; San José Island, Amortiguado Bay.

Four or five specimens only. Color of carapax in spirits, whitish, with a tinge of red, and with red markings. The front is much more produced than usual in this species.

No. 32. Male, dried. San Diego. Hy. Hemphill.

All but one of the specimens from Lower California are smaller than the type specimen which was procured at San Diego, and the carapax is proportionally narrower, yet I believe them to be younger individuals of the same species, founding my belief on the prominent, narrow, entire part, curved outline of the antero-lateral margin, without perceptible angle at its junction with the postero-lateral; and on the character of the left cheliped, the fingers of which are sulcate, and devoid of prominent tubercles on their palmar surface.

Xantho spin-tuberculatus. Lockington. Santa Rosa Island, Monterey, San Diego, Magdalena Bay, San José Island.

This species appears to be of common occurrence along the coast from Monterey southward to Magdalena, but to disappear, or at least become rare, in localities further south.

Dimensions of the largest specimen:

	M. M.
Greatest length of carapax	30
Greatest width of carapax.....	40

The right hand in this large specimen (a male) is very much larger than the left, but this is not universally the case.

Color, in spirits: carapax greenish, with maroon cloudings; tubercles of first pair and front of carapax bright red; hinder limbs crossed by maroon bands; fingers black.

Xantho

No. 33. Monterey. Dried. J. G. Cooper.

Xantho Hemphilliana. Lockington, Proc. Cal. Acad. Sci., Feb. 7th, 1876.

The only specimen I have seen of this species is the one in the possession of the Academy of Sciences, San Francisco. Some small crabs from the Gulf of California, which I at first believed to be young specimens of this form, differ in their less transverse form and more perfect areolation, and I now think them distinct, yet this can only be proved by the examination of a complete series of the Monterey form.

No. 35. Large male, dried. Monterey. Hy. Hemphill.

Xanthodes leucomanus. Lockington, Proc. Cal. Acad. Sci., Feb. 7th, 1876.

Carapax rather narrow; areolation very distinct, cardiac region circumscribed; three antero-lateral teeth (the three posterior ones) usually distinct, and directed laterally, the space usually occupied by the first two antero-lateral teeth forming an almost straight line. Basal joint of outer antennae reaching the front; lower margin of orbit two-lobed; inner hiatus wide; front sinuate, a process meeting the basal joint of the external antennae. Internal antennae stout. Chelipeds sub-equal, manus broadly ovate, stouter than the carpus, smooth, shining, with a slightly raised upper edge; dactylus and pollex alike, short and stout, conical, toothed inside; furrowed. Carpus often with a roughened upper surface. Ambulatory feet almost free from setae, but the dactyli thickly covered with very short tomentosity.

	♂	♀
	M. M.	M. M.
Length of carapax.....	9	8
Width of carapax.....	11	9.5

Numerous specimens of this species were brought from La Paz, Port Escondido and Mulege Bay, Gulf of California, by W. J. Fisher. They show great variation in color, areolation, and other characters. In some the posterior portion of the carapax is much less distinctly areolated than in others; many individuals have the upper surface of the carpus, and even that of the manus, more or less rugose; some have black fingers with white tips, others have colored fingers, and the general tint of the carapax varies considerably. The original specimens from which my previous short description of this species was written, were lost in removing our collection, and I cannot, therefore, feel certain of the identity of the Gulf form with the one first described.

Xanthodes? angustus. nov. sp.

Carapax narrow, front wide, slightly sinuate; antero-lateral margin shorter than postero-lateral, three-toothed; teeth pointed forwards; the posterior margin of the hindmost teeth in a line with the postero-lateral margin. Upper margin of the orbit two-lobed, excluding the post-orbital, which is lower than the two succeeding antero-lateral teeth. Upper surface of the carapax smooth, shining, without areolation, except in the frontal region, and near the antero-lateral teeth. Chelipeds smooth, shining, without areolation, hairs or tubercles, hands rather broad, equal in size, fingers of right hand tuberculate

on the palmar surface, those of left hand with a cutting outer edge. Hinder pairs of limbs slender, slightly pilose. Color reddish brown (in spirits), chelipeds bright red.

Localities—Magdalena Bay, west coast Lower California; Mulege Bay, Port Escandido, San José Island, Gulf of California.

	M. M.
Width of carapax.....	14
Greatest length.....	10

These dimensions are from one of the largest specimens.

The extreme narrowness of the carapax and shortness of the antero-lateral margin make me doubtful of the propriety of placing this species in the subgenus *Xanthodes*. Its aspect is much that of a *Pilodius*, but the fingers are not spoon-shaped. There are a few scattered setæ on the two last joints of the ambulatory feet. There is considerable resemblance between this species and *X. latimanus* from San Diego, but the hands of the former are wider and the antero-lateral teeth more robust. The difference in size between the present form and the single male of *X. latimanus* in the Mus. Cal. Acad. Sci. is great, but it is not unlikely that it is either the young or a small variety of that species, but as the gulf species are in most cases distinct from those of the west coast of Lower California, I do not venture to unite them.

Xantho latimanus. Lockington, Proc. Cal. Acad. Sci., Feb. 7, 1876. - *W. H. S.*
No. 34. Male, dried. San Diego. Hy. Hemphill.

Panopæus purpureus. nov. sp.

Carapax convex both longitudinally and transversely, branchial regions tumid, sulcus between gastric and cardiac regions distinct. Surface finely granulated, the granulations with a tendency to form beaded ridges. Intra-medial and extra-medial regions distinct from each other and from the antero-lateral. First two teeth of antero-lateral margin coalesced, forming a prominent bi-lobed tooth; third and fourth teeth curved forwards, the fourth shortest; fifth thick and rounded, directed forwards. Sub-hepatic spine prominent. Inferior margin of orbit three-lobed; interior lobe inconspicuous; middle lobe narrow, thick, projecting; outer lobe long, low, thin, highest on its outer angle. Outer hiatus of orbit deep and narrow. Superior margin of orbit with slight indications of a division into three lobes. Chelipeds smooth, unarmed, the right the larger; propodi and dactyli of hinder limbs beset with short bristly hairs. Color of carapax and upper surface of chelipeds bluish purple, becoming darker in the older specimens. Irregular spots and blotches of a dark brownish purple are conspicuous in the younger specimens, but become indistinct in the older, except upon the chelipeds. Fingers brown, with white tips.

	♂ Inches.	♀ Inches.
Greatest length of largest specimens	1.30	.95
Greatest width of largest specimens.....	1.75	1.30

Localities—Magdalena Bay, west coast Lower California; La Paz, Gulf of California. Apparently rare, as Mr. Fisher obtained but few specimens.

No. 44. Male and female. Magdalena Bay. W. J. Fisher.

Panopæus transversus? Stimpson, Am. Lyc. Nat. Hist., N. Y., vol. VII, p. 210.

Numerous specimens of a small species of *Panopæus* from Lower California do not agree at all with any of the species described by S. I. Smith, in the Proc. Boston Soc. Nat. Hist., vol. XII, Feb. 3, 1869, and from their transverse shape and the small size of the sub-hepatic spine, may probably be the *P. transversus* of Stimpson. As, however, I have no access to Stimpson's description, I think it well to subjoin a short description, as it may possibly prove to be a distinct species. Front slightly sinuate, antero-lateral teeth four, the two first long and low, the last two more pointed, with the points turned forwards. Right cheliped slightly the larger, both chelipeds smooth, shining, whitish, except on the upper surface, where the tint deepens to a reddish brown; which is the general color of the carapax. Hinder pairs of legs tomentose. Two of the largest specimens measured as follows:

Length of carapax.....	♂ 0.65	♀ 0.56
Width of carapax.....	0.92	0.80

Numerous specimens were obtained in San Bartolomé and Magdalena bays, and Santa Maria Bay, all on the west coast of Lower California; also, at La Paz, Gulf of California, where it was dredged at (so far as I can make out the label, which was unfortunately torn) a depth of three fathoms. The veritable *P. transversus* was found at Corinto, Nicaragua, by J. A. McNeil (*vide* S. I. Smith, *loc. cit.*).

No. 45. Several specimens, in spirits, from Magdalena Bay. Fisher and Lockington.

Panopæus validus. S. I. Smith, Proc. Boston Soc. Nat. Hist., 1869, 273.

Panama and Acapulco. External opening of orbit broad and deep.

Panopæus Bradleyi. S. I. Smith, *loc. cit.*, 281.

Panama. External opening of orbit a deep notch rather than a groove.

Panopæus planus. S. I. Smith, *loc. cit.*, 283.

Panama. Sub-hepatic tubercle not prominent. Antero-lateral margin with four slight incisions, as in *P. transversus*.

Acanthus spino-liratus. Lockington, Proc. Cal. Acad. Sci., Feb. 7, 1876.

The range of this species is much more extensive than that of most of those described in the paper above referred to. The first specimen obtained was brought, with specimens of several other species, from San Diego; but whereas most San Diego forms extend down the western coast of Lower Cali-

fornia, but do not appear—judging from present knowledge—to inhabit the Gulf of California, the present species has been found in abundance at La Paz, Mulege Bay, Port Escondido and San José Island, all within the Gulf. One peculiarity of this form is the bright red tint of the prominent transverse ridge in front of the buccal area. None of the specimens I have seen from Lower California exceed in size that brought from San Diego.

No. 36. Male, dried. San Diego. Hy. Hemphill.

Menippe obtusa. Stimpson, Notes on N. Amer. Crust. (Annals Lyc. Nat. Hist., N. Y., 1858), p. 7.

Panama.

CHLORODINÆ.

No species of this group is mentioned by Stimpson, either in Crust. and Echi. Pac. Shore N. Amer., or "Notes of North American Crustacea." I have here described three species, all of which were brought from Lower California by Mr. W. J. Fisher. Although distinguished as a sub-family on account of the more or less perfect spoon-shaped tips of the dactylus and pollex of the chelipeds, the *Chlorodina* are so closely related to the *Xanthina* that it would be more natural to intercalate their genera among those of that sub-family; for instance, *Chlorodius* next to *Xantho*, and *Actæodes* next to *Actæa*.

Actæodes mexicanus. Lockington, Proc. Cal. Acad. Sci., March 20, 1876.

Mazatlan, Magdalena Bay, La Paz, where a few were dredged in thirteen fathoms; Port Escondido, Gulf of California; San José Island, Amortiguado Bay, Mulege Bay. The carapax of the largest specimen obtained measures 33 millimetres in width, and 21 in length. The color ranges from dark reddish brown, sometimes tinged with green to almost white, and in some cases even the fingers are whitish. Females with ova were collected from July to August. This species is found at low tide, under stones and in coral.

No. 37. Male, dried. Mazatlan. H. Edwards.

No. 46. Male and female, in spirits. Magdalena Bay. W. J. Fisher.

Actæodes xantho. nov. sp. // *Actæa xantho*.

Carapax broadly transverse, without teeth on antero-lateral margins or front, which slightly curve outwards in front of each areolet. Areolation complete, middle region with nine areolets. The hinder posterior areolet (2P. Dana) entire, long and narrow, four smaller areolets between this and the median region, and ten areolets on the antero and postero-lateral regions of each side. Chelipeds short, the meros hidden beneath the carapax, manus and carpus about equal in length, their upper surface covered with tubercles about as large as those of the carapax. All the raised portions of the carapax, and tubercles of areolets covered with granules, the sulci between tomentose. Dactyli of first pair very short, obtuse at end, the tips somewhat hollowed out, but the hollows not circumscribed within. Hinder feet short, compressed, their upper surface with elongated tubercles less distinctly granulated than

those of the carapax and chelipeds, the sulci and terminal joints tomentose. Abdomen tomentose.

	M. M.
Length of carapax.....	11.5
Width of carapax.....	18

A single specimen, female, from San José Island, Amortiguado Bay, Gulf of California. In spirits, the areolets are of a bright yellow color. There are five tubercles on the carpus, and as many on the hand. The genera *Actæa* and *Actæodes* are usually placed in separate sub-families, but the artificiality of this separation is evident to any one who compares the species belonging to the two genera. In this species, as in *A. speciosa* and *A. cavipes*, Dana, and *A. mexicanus (nihil)*, the tips of the fingers are but imperfectly excavate, and the forms belong as truly to *Actæa* as to *Actæodes*. The two genera form, in fact, a continuous series of closely allied species.

Chlorodius Fisheri. nov. sp.

Similar in proportions to *C. sanguineus*, Edwds, but the carapax is widest between the posterior teeth of the antero-lateral margin. Front 4-lobed; a deep emargination between the long central lobes. Teeth of antero-lateral margin five in number, acute, sub-equal, and directed forwards. Areolation less distinct than in *C. sanguineus*; areolets well-defined anteriorly, but not posteriorly. Pre-medial areolets joined to the extra-medial; intra-medial separated from the posterior or cardiac by a distinct sulcus; areolets of antero-lateral region six in number; postero-lateral and posterior regions without distinct areolation. Chelipeds equal, smooth, except a tooth on inner angle of carpus; all the fingers spoon-shaped, but the cavity not circumscribed within. The fingers are sulcated. Posterior legs slightly setose, claws sharp.

Color. Carapax, greenish red; chelipeds, marbled with purplish red, white beneath; fingers, black. Length of carapax of largest specimen (male), 0.78 in.; greatest width, 1.06 in.

Numerous specimens from the West coast of Lower California, collected by W. J. Fisher, also from La Paz, San José Island, Mulege Bay and Port Escondido, all in the gulf of California. It is found on the flats at low tide.

No. 47. In spirits, Magdalena Bay. W. J. Fisher.

Family ERIPHIDÆ.

27. *Ozius verreauxii*. De Saussure. Revue et Magasin de Zoologie, V, 359, pl. XII, f. 1.

Mazatlan.

28. *Xanthodius sternberghii*. Stimpson. Notes on North American Crust. 6. Panama.

29. *Pilumnus limosus*. S. I. Smith. Proc. Bost. Soc. Nat. Hist, XII, 286, 1869.

Panama. Peru.

30. *Eriphia squamata*. Stimpson. Notes on North American Crustacea, p. 10. (Annals Lyceum Nat. Hist., N. Y.)
Panama. Corinto, Nicaragua.

31. *Trapezia formosa*. S. I. Smith. Proc. Bost. Soc. Nat. Hist., Feb. 3 1869.

Pearl Islands, Bay of Panama, among *Pocillopora capitata*, Verrill.

32. *Trapezia cymodoce?* Guérin. Dana. U. S. Ex. Exp., p. 257, pl. XV, Fig. 5. S. I. Smith, *loc. cit.*

Locality the same as the preceding species.

33. *Quadrella nitida*. S. I. Smith. *loc. cit.*

Locality, Pacheca, one of the Pearl Islands, 6 to 8 fathoms, among pearl oysters.

When Stimpson, in 1857, published his "Crustacea and Echinodermata of the Pacific Shores of North America," not a single species of the large family *Portunidae* had been discovered. The same naturalist in his "Notes on North American Crustacea," published in 1859, mentions one species, *Lupa bellicosā*, Sloat, MS., but gives no description, remarking that it "agrees with *L. hastata* in almost every character, except that the last two joints of the abdomen in the male are broader and more flattened."

In February of this year I described a second species, a specimen of which had been procured the preceding year at Mazatlan by Mr. Henry Edwards; and I shall in this paper describe a third, of which many individuals have been collected by Mr. W. J. Fisher at various points on the Western and Eastern shores of Lower California. At Magdalena Bay Mr. Fisher procured several very specimens of a *Lupa*, which I take to be the *L. bellicosa* of Sloat and Stimpson, but as Sloat's MS. is not on hand, and Stimpson gives no figure, my sole reason for this belief is that the other two known species from Lower California, belong to the genus *Amphitrite*, as defined by Dana.

That there may be no confusion I append a description of this *Lupa*.

Lupa bellicosā? Sloat, MS. Stimpson. Notes on N. Amer. Crust., p. 11.

Carapax regularly arched in its longitudinal and transverse directions; exceedingly wide, the post and antero-lateral outlines forming a long ellipse; no areolation except a sulcus between the median and posterior regions. Central tooth of front placed low down, between the internal antennae, and separated by a short, somewhat pilose, space from the front proper, which has two lateral spines separated by a sinuous central portion. Upper margin of the orbit consisting of two long teeth, an ante and post-orbital; the former highest above the outer antennae, and separated by a deep notch from the latter, which is two-lobed, the anterior lobe low, and the posterior long and pointed. Antero-lateral teeth nine, including the posterior lobe of the post-orbital, which exceeds in height any of the others except the ninth. 2d, 3d,

antenna much shorter than orbit. Orbitate, carapax
not so elevated as in *L. hastata*.
H. I. Smith, from the same locality as the preceding species.
not so elevated as in *L. hastata*.
not so elevated as in *L. hastata*.

4th, 5th, 6th, 7th and 8th antero-lateral teeth equal, all broadly triangular. Ninth tooth much the largest, its upper ridged edge continuing across the carapax for some distance. Lower margin of the orbit pilose, rising into a conspicuous tooth immediately below the outer antennæ. Underside of carapax and sternum without hairs, except below the hinder part of the antero-lateral regions. Meros of first pair trigonal, with four sharp spines on its upper anterior edge and two blunt teeth at the distal extremity of its posterior edge. Carpus with two or three ridges exteriorly, and some short, blunt spines anteriorly. Manus with a triangular tooth next the carpus on its upper anterior edge, and also a blunt tooth at the distal extremity of its upper posterior margin. Dactyli only slightly sulcate; the teeth of the inner margins in groups of three; the central one largest. Second, third, and fourth pairs of limbs stout; the two last joints compressed and sulcate, pilose posteriorly. Fifth pair stout, without sulcations on the last two compressed joints.

Several fine specimens of this species were brought from Magdalena Bay, by Mr. W. J. Fisher.

The dimensions of a large individual, of each sex, are as follows:

	♂ M. M.	♀ M. M.
Length of carapax	6.	5.3
Greatest width of carapax	11.5	10.2
Length of right manus	7.	5.

The color is almost brown above, cream-colored below, the tubercles and ridges of the manus tinged with red.

No. 22. Male, in spirits; fine specimen. Fisher and Lockington.

Lupa dicantha. M. Edwards. Hist. Nat. des. Crust., tom. 1, p. 451. Dana. U. S. Ex. Exp., 1, 272, pl. XVI, fig. 7, T. Hale Streets. Proc. Acad. Nat. Sci., Phil., 1871, p. 239.

Amphitrite Edwardsii. Lockington. Proc. Cal. Acad., March 20, 1876.

On looking over a number of Amphitrites from Lower California, I found one only, a large female, that can be referred to this species.

It presents all the characters of the type in the Academy's museum, but in a more marked degree from its larger size. The nine spines of the antero-lateral margin are alternately large and small, the ninth no larger than the first, third, fifth, and seventh; and the points of all are black. The meros of the first pair of legs has five black-tipped spines, that nearest the carpus smaller than the central three and equal to the proximal one. The inter-orbital teeth are eight in number, and the ridges across the carapax well defined. The spines of carpus and manus agree exactly with those of the smaller specimen, previously described, and all are tipped with black.

The general color of the carapax and limbs, in spirits, is red, with lighter marblings. The tips of the fingers are black.

	M. M.
Extreme width of carapax	51
Extreme length	32
Length of movable finger	13

The upper part of the carapax is thickly tomentose, except upon the ridges. This species is well marked, and readily distinguished from the following.

No. 23. Female, dried. Mazatlan. Hy. Edwards.

Amphitrite paucispinis. Lockington.

Inter-antennal front four-lobed; pre-orbital spines slightly two-lobed. Antero-lateral spines were nearly equal in size, except the ninth, which is twice the length of the others. The outline of front portion of carapax between the last antero-lateral spines, on each side, is a regular ellipse. Posterior to the last antero-lateral spine the carapax contracts suddenly in width, so that the postero-lateral margins are L-shaped. Meros of first pair with four spines on its anterior margin, the proximal smallest. Carpus with one spine on the interior upper margin, and two on the exterior. Manus with one spine only, on its upper margin, forming the extremity of a carina. Four slightly beaded ridges on the outer side of the manus. Fingers sulcate, tubercular on the palmar margin, the movable finger with a large tubercle at the base. Second, third, and fourth pairs of limbs slender; penultimate joint of fifth pair sulcate and surrounded, as is also the last joint, with a regular fringe of hairs. Areolation of carapax very distinct; the summits of each region granulated.

The dimensions of two of the largest specimens, both female, are as follows:

	M. M.	M. M.
Extreme width from tip to tip of spines.....	40	54
Greatest length.....	23	30

Localities—Angeles Bay, Mulege Bay, both in the Gulf of California; Magdalena Bay, West Coast Lower California.

The specimens were collected at low tide in August and September, and many of the females have the ova attached.

No. 24. Two males, dried. Magdalena Bay, West Coast Lower California. Fisher and Lockington.

Aræneus bidens. S. I. Smith. Report Peabody Acad. Sci., 1869, p. 90.

Callinectes-sp?—"Agrees with Ordway's *C. arcuatus*. Bost. Jour. Nat. Hist. VII, p. 578, except that there is only one distinct spine on the carpus of the chelipeds." S. I. Smith. *loc. cit.*

In my last paper upon this subject, two species of Maioid crabs mentioned in a "Catalogue of Crustacea from the Isthmus of Panama," by T. Hale Streets, was included, viz.: *Homalacantha hirsuta* (T. Hale Streets), and *Mithraculus coronatus* (Stimpson). Mr. Streets does not state on which side of the Isthmus the various species enumerated in his catalogue were collected; therefore, although I am aware that in some cases the same species occurs on both sides, I shall not in future include in this catalogue any but undoubtedly Pacific species.

Mr. Streets describes the following new species, giving Isthmus of Panama as their locality:

Mithraculus coronatus.

Aniculus longilarsis.

Cenobita intermedia.

Gebia longipollex.

Alpheus bispinosus. *provs. Atlanticus*

The following species included in his list are Atlantic forms, some of which may possibly occur in the Pacific, also:

Mithraculus coronatus, St..... Gulf of Mexico, Brazil.

Carpilius corallinus, M. Edwards..... Antilles.

Actea labyrinthica, St.?

Menippe mercenaria, St..... Atlantic.

Lupa rubra, M. Edwards..... Brazil.

Ocypoda rhombea, M. Edwards..... Antilles, Brazil.

Uca laevis, M. Edwards..... Antilles, Brazil.

Hippa emerita, M. Edwards..... Antilles, Brazil.

Cenobita diopanes, M. Edwards..... Antilles.

Panulirus gattatus, Latn. M. Edwards..... Antilles.

“ *americanus*, Lamk, M. Edwards..... Antilles.

The following ^{probably} reach as far north as Panama, and are therefore referred to in their order:

1. *Panopeus chilensis*.

4. *Ocypoda Gaudichaudii*.

2. *Lupa dicantha*.

3. *Eriphia gonagra*.

W. N. Lockington read the following:

Notes on Californian Fishes.

BY W. N. LOCKINGTON.

Raia batis. Linn.

Uraptera binoculata. Girard.

Dr. A. Gunther, in the Cat. Fishes Brit. Mus., Vol. VIII, p. 465, states his belief that the latter of these fishes may be regarded as a climatic variety of *R. batis*. He goes on to say that “young examples have a round obscure spot on each pectoral fin.”

Had Dr. Gunther seen the fish alive, or in a fresh condition, I think that his opinion would have been different, but, as the Catalogue shows, his only specimens were young, one from San Francisco, presented by Dr. W. O. Ayres, the other a skin only, presented by J. Keast Lord, from Vancouver Island.

I have myself seen specimens of large size in which the spot is as distinct as in the young, and though I cannot say I have measured them, I feel assured that one I saw in the aquarium at Woodward's Gardens about a year ago was two feet across the fins; and that the one now there is about eighteen inches.

Moreover, the eye-like spot in the centre of the pectoral is anything but obscure in the recent fish, it is most conspicuous.

But this is not all. We have in our possession a fish (caught in San Francisco Bay,) which agrees in every respect with the description of *R. batis* in the Brit. Mus. Cat.

I subjoin the dimensions—

	INCHES.
Width across pectorals.....	18.38
Tip of snout to centre of posterior jaw.....	4.12
“ “ anterior edge of anus.....	12.75
“ “ “ “ orbit.....	4.12
Tail to back of ventrals.....	8.75
Inter-orbital space (width of).....	1.37
Width across ventrals.....	7.50

Body and fins of a uniform slaty brown color. The difference in aspect between this fish and the *Uraptera* or *Raia binoculata* is very great.

Centropomus. Sp.?

Body oblong, compressed; head contained four and a half times in the total length; outline of top of head nearly straight, slightly concave, ridges of upper surface prominent; depth increasing to origin of first dorsal, thence nearly equal to root of second dorsal, thence decreasing gently to peduncle of tail. First dorsal with eight spines—the first minute; the second about one-sixth the length of the third; third, longest, very stout; fourth, fifth, sixth and seventh rapidly decreasing; eighth, prostrate. Pectorals small, extending to little more than the half length of the ventrals, which exceed them in size. First spine of anal very small; second, long and stout; third, slender, but slightly the longest. The orbit is slightly elliptical. Lower jaw protruding beyond the upper; maxillary, when the mouth is closed, extending to a perpendicular from the centre of the pupil. Teeth nominal. Pre-operculum strongly serrated. Color, when fresh, back to lateral line dark green, becoming lighter below, and whitish on the belly. Snout, green, yellow on the sides. Iris, golden. Pectorals, lead-color, with green centre; ventrals, the same. Caudal, lead-color in centre, with green margins. Dorsal, green, with bluish stripe, and tipped with golden. Fin-formula, D. $8 + \frac{1}{10}$; A. $\frac{3}{6}$. Branchiostegals, 7. The following are the principal dimensions of the specimen presented:

	Fl.	In.
Total length, from tip of lower jaw to end of tail.....	1	5.5
Length of head, from tip of upper jaw.....		3.88
Tip of snout to origin of first dorsal.....		5.5

Origin of first dorsal to origin of second dorsal.....	3.35
Length of third dorsal spine.....	2.25
Length of base of first dorsal.....	2.75
Length of base of first anal.....	1.5
Eye to tip of snout.....	1.3
Circumference at origin of spinous dorsal.....	7.5
Width of inter-orbital space.....	0.63

The single specimen was taken by Mr. W. J. Fisher, off Asuncion Island, Lower California, at a depth of eight fathoms.

The proportions and coloration of this fish agree very nearly with those of *Centropomus undecimalis*, Cuv. and Val.; and I strongly suspect its identity with that species, which is, however, not known to me from specimens or figures.

C. undecimalis is a native of the Atlantic shores of tropical America; but Dr. Gunther queries its occurrence at Lima. If it should prove, on further acquaintance, to be a distinct species, I propose to name it *Centropomus viridis*.

Remarks on the Crustacea of the West Coast of North America, with a Catalogue of the Species in the Museum of the California Academy of Sciences.

BY W. N. LOCKINGTON.

GRAPSOIDEA, OR OCYPODIDÆ.

OCYPODIDÆ.

Ocypoda Gaudichaudii? Edwds. & Luc. D'Orbigny's Voy. in Am. Merid. Crust., p. 26, pl. XI, fig. 4.

As I have not seen Edwards' description of this species, I subjoin a short description:

Carapax slightly wider across the centre than in front. Lateral angles of anterior margin very prominent, upper orbital border sinuate; front narrow, eyes large. Right cheliped much larger than the left in both sexes; arm trigonal, with its inferior surface somewhat concave, in consequence of both its margins being slightly raised and beset with spinous tubercles; the upper margin rounded, rugose with rows of small tubercles. Carpus short and stout, with a sharp spine on its anterior border at distal end, and rows of small tubercles above, becoming more prominent and somewhat spinose distally. Manus broad and thin, covered with tubercles exteriorly; a row of saw-like spines along the lower margin continued along the propodal finger, which is cristate, hooked at end, and with several teeth internally. Movable finger similar to fixed, spinose along its upper margin.

Ambulatory limbs flattened; merus with a sort of roll on its upper margin, crossed by tubercular rugæ. Carpi of second, third and fourth pairs setose at distal lower extremity; propodi of the same three pairs setose below; carpus and propodus of fifth pair without hairs; all the dactyli fringed in front with setæ. Third joint of outer maxillipeds narrower, and about half the length of the second joint.

First two segments of male abdomen very short; third and fourth longer, fifth still longer, sixth longest. Fifth segment narrowest; sixth convex on both sides; seventh a small truncate triangle. Fourth and fifth segments of

female abdomen widest; sixth a semi-ellipse, with the small seventh segment inserted in a concavity of the anterior margin.

	♂	♀
	M. M.	M. M.
Greatest length of carapax.....	45	32
Greatest width of carapax.....	53	37.5
Length of right manus.....	48	28
Width of right manus.....	28	15

Several specimens from Magdalena Bay, West Coast Lower California; La Paz, Lower California; and Boca de las Piedras, Sinaloa, Gulf of California.

O. Gaudichaudii was found at Panama by Mr. Sternbergh (Stimpson, Notes on North Amer. Crust., p. 15); and also in the Gulf of Fonseca, Central America, by J. A. McNeil (S. T. Smith, Peabody Acad. Sci., 1869, p. 91).

No. 43. Male and female. Gulf of California. W. J. Fisher.

Genus *Gelasimus*.

Six species of this genus are included in the collection of Mr W. J. Fisher. One only of these belongs to the section having a narrow front, with the bases of the ocular peduncles close together. This is the *G. princeps* of S. T. Smith.

Another species, having the fourth, fifth and sixth abdominal segments united, is certainly the *G. gibbosus* of the same author. Another I believe to be the *G. brevisfrons* of Stimpson.

None of the remaining kinds answer to Stimpson's and Smith's description of *G. panamensis*, so that unless two of them are referable to the Chilean species, *G. macrodactylus* and *G. stenodactylus*, it is fair to suppose they are new species. I have described two of them as new, and the remaining one, with some misgiving, I provisionally refer to *G. stenodactylus*.

Gelasimus princeps. S. T. Smith. Trans. Conn. Acad., 11, 120, plate 11, fig. 10; pl. 111, f. 3-3c.

This species is found in holes under rocks at low tide. The female, as noticed by S. T. Smith, differs considerably from the male, having the carapax less narrowed behind, with granules thickly scattered over the dorsal regions.

Two large specimens measure:

	♂	♀
	Inch.	Inch.
Extreme width of carapax.....	1.65	1.37
Extreme length of carapax.....	1.03	.35
Length of large hand.....	3.00	
Width of large hand.....	0.95	

Localities—Magdalena and San Bartolomé Bays, West Coast Lower California. W. J. Fisher. Corinto, Nicaragua. J. A. McNeil.

No. 51. Male and female. Magdalena Bay, in spirits. Fisher and Lockington.

G. heterophthalmus. S. T. Smith, *loc. cit.*, 116, pl. 11, f. 6; pl. 111, f. 1-16. Gulf of Fonseca, West Coast Central America.

G. heteropleurus. S. I. Smith, *loc. cit.*, p. 118, pl. 11, f. 7; pl. 111, f. 2-26. Gulf of Fonseca, W. C. Cent. Amer.

G. armatus. S. T. Smith, *loc. cit.*, p. 123, pl. 11, f. 5; pl. 111, f. 4-4d. Gulf of Fonseca.

G. ornatus. S. T. Smith, *loc. cit.*, 125, pl. 11, f. 9-9a; pl. 111, f. 5-5c. W. C. Cent. Amer.

G. brevifrons. Stimpson. Ann. Lye. Nat. Hist., New York, vol. vii., p. 229. S. T. Smith, *loc. cit.*, 131.

I have not seen Stimpson's description of this species, but from Smith's comparison of its carapax with that of *G. minax*, I conclude that several specimens collected by Mr. Fisher on the West Coast of Lower California, belong to this species. The meros of the larger cheliped is stout, triquetral, and marked on its exterior surface with transverse setose striæ; the carpus has a rounded tooth at its inferior distal end, and the manus is large and heavy, twice as large as the width of the carapax, the palmar portion rounded and smooth, but minutely granular on the outside, and on the inside beset with small tubercles on its more elevated portions. The depression for the carpus is short but very deep, the thin upper edge of manus curving inwards over it. The propodal finger is slightly deflected downwards, and the dactylus curved from the base, the curve increasing towards the tip. The tubercles of the inner edges of the fingers are very indistinct, except one near the centre of the propodal finger, and another close to the tip, which thus appears bifid.

In the smaller cheliped the tips of the fingers are obtuse and rounded, and the outer edges raised, so that they are imperfectly spoon-shaped. The dactylus and propodal finger are almost parallel and near each other, but touch only at the tip, where they have a few setæ.

The meral segments of the ambulatory legs are plicate, like those of the chelipeds.

Following are the dimensions of two large specimens:

	♂	♀
	M. M.	M. M.
Length of carapax	17	13
Width of carapax	23	15
Length of larger hand	45	

The fourth, fifth, and sixth segments of the abdomen in the male are not united.

The carapax in this species is considerably narrowed posteriorly, is much less convex than usual in the genus, and of an olive color. The chelipeds of the female closely resemble the smaller cheliped of the male.

No. 85. Male and female. Magdalena Bay, in spirits. Fisher and Lockington.

Gelasimus stenodactylus? Edwds. & Lucas, Voy. dans L'Amer. Mer. Crust., 26 pl. 11, f. 2. M. Edwds. Ann. des Sci. Nat., 3d serie. Zoöl., tome xviii., p. 149. S. T. Smith, *loc. cit.*, 139.

I have not seen the description of this species by Edwds. and Lucas, and therefore question its identity with a single male specimen of a *Gelasimus* with very short fingers that was brought from the West Coast of Lower California by Mr. Fisher.

The fingers of the larger cheliped are very short, the dactylus does not attain the length of the inferior margin of the palm, and the propodal finger is much shorter.

The manus of the smaller cheliped resembles that of *G. gibbosus*. The carapax is highly convex, the anterior lateral angles almost in a line with the front, so that the orbital border is but slightly sinuous; the inferior orbital border dentate, and the lateral margins converging.

	M. M.
Length of carapax	7
Breadth of carapax.....	13
Length of larger hand	14

Gelasimus rectilatus, nov. sp. 2

Among the *Gelasini* collected by Mr. Fisher on the West Coast of Lower California are two specimens which I cannot refer to either of the broad-fronted species from this coast, described by S. I. Smith and Stimpson, viz: *G. gibbosus*, *G. panamensis* and *G. brevifrons*. As I have not seen the descriptions of *G. macrodactylus* and *G. stenodactylus*, it may possibly be one of these, though neither name seems applicable.

I append a short description:

Front narrower than usual in the broad-fronted section of this genus, not much more than half the width of the buccal frame; carapax tapering posteriorly, the sides forming an almost straight line from the antero-lateral angles to the straight posterior margin; antero-lateral angles much posterior to the line of the front, acute and with considerable lateral projection. Upper orbital border highly sinuous entire, lower orbital border toothed at its outer angle. Outer maxillipeds greatly gibbous, the buccal area separated from the jugal by a distinct depression. Larger cheliped smooth (microscopically granulated), except on inner surface of manus, where there is a line of small tubercles on the inner edge of the propodal finger, and a second on the ridge proceeding upwards from the lower edge of that finger. Fingers tubercular on their inner edges, the largest tubercles that in the centre of the length of each, and that near the tip of propodal finger. Fingers of smaller cheliped parallel, equal, imperfectly spoon-shaped.

Hands of female similar to the smaller cheliped of male. Ambulatory feet

entirely smooth, with a few hairs. Abdomen of male with all the joints distinct, gradually narrowing from the base.

	♂	♀
	M. M.	M. M.
Length of carapax	9	8.5
Width of carapax.....	14	13
Length of larger hand.....	19	

The larger hand greatly resembles that of the species I have referred to *G. brevifrons*, but the fingers are proportionally shorter, a character which may, however, be due to immaturity. The great differences between this form and *G. brevifrons* are the entire want of the meral plications, and the form of the lateral margins of the carapax, which in the latter continue nearly perpendicular to the front for some distance before they commence to converge.

A single pair is all I have seen of this form. The great convexity of the carapax, and the absence of any coarse granules on the front and anterior part of the branchial regions, distinguish it from *G. panamensis*.

Gelasimus crenulatus. nov. sp.

Carapax highly convex, transverse, antero-lateral angles acute and prominent, slightly posterior to the front; superior orbital margin sinuous, inferior crenulated, the teeth equal in size and with a straight upper edge.

Dorsal surface smooth and shining; median and lateral gastric regions clearly marked off; cardiac distinct; branchial regions prominent, tumid, each divided in two by an indistinct sulcus, parallel with the lateral margins of the carapax.

A broad ridge on the inner edge of the fourth joint of outer maxillipeds, continued downwards along the greater portion of the inner edge of the third joint. Merus of greater cheliped stout, triquetral, marked with numerous short, transverse, not prominent rugae. Carpus and manus smooth and unarmed, except a few small tubercles on the raised line anterior to the depression for the carpus on the inside of the manus. Propodal finger long and slender, pointed at tip, and with a tubercle in the centre of its length. Dactylus longer than propodal finger, curved, the tip of the curve considerably overpassing that of the latter. Merus of smaller hand slender, triquetral, smooth, carpus smooth, about equal in length to the palm of the manus; fingers equal, parallel, near together, touching at tips, which are pointed.

Hands of female like those of smaller male cheliped. Ambulatory feet smooth and shining, with a few long setae on the propodi, and more numerous and shorter setae on the dactyli.

The hand of this species is similar to that of *G. brevifrons*; the gibbous carapax, with its areolations, resembles closely *G. gibbosus*, but the third, fourth and fifth segments of the abdomen are free, instead of anchylosed, as in that species; and the margins of the carapax again resemble those of the species I have referred to *G. brevifrons*, but the convexity of the surface, with the tumid branchial regions, give it a very different appearance.

Unless this is the *G. macrodactylus* of M. Edwards, found on the coast of Chili, it is certainly a new species.

No. 49. Todos Santos Bay, near San Diego, dried. Hy. Hemphill.

No. 50. " " " " " " in spirits. Hy. Hemphill.

Gelasimus gibbosus. S. I. Smith. Trans. Conn. Acad., March, 1870, 140; plate 11, f. 11; pl. iv., f. 8.

Numerous specimens from the West Coast of Lower California, principally from San Bartolomé Bay, agree with Smith's description and figure of this species in every particular, except in having the front more suddenly curved forwards. The sub-hepatic regions are thickly setose.

The fingers of the smaller cheliped are equal in length, and twice as long as the broad, stout, and short palmar portion of the manus: they are widely separated at their base, gape throughout their length, and are curved to meet each other at their extremities, which are of a yellowish brown tint. There are a few scattered hairs on the fingers. In the female both chelipeds are exactly like the smaller cheliped of the male.

The depression between the buccal and sub-hepatic (jugal) areas is very distinct; the teeth of the inferior margin of the orbit increase in size and slenderness on the outer portion; and the fourth, fifth and sixth abdominal segments are anchylosed. The prevailing tint of the carapax and limbs (in spirits) is blue, of varying intensity, shading in parts into greenish and into white on the fingers of the chelipeds. Many very small specimens have the fingers of the larger cheliped but little developed, not exceeding the palm in length, and closely approximated to each other.

At first I thought these to be a distinct variety, but now believe them to be the young of the same species, as they agree in every other particular, and some show evidences of a change in the relative proportions of the palm and dactyli as growth progresses.

No. 86. Male and female, in spirits. Bartolomé Bay. Fisher and Lockington.

GECAECINIDÆ.

Cardiosoma crassum.? S. I. Smith, *loc. cit.*, 144; pl. v., f. 5. Gulf of Fonseca, W. C. Cent. Amer. La Paz, Lower California.

A single fine male specimen from the latter locality agrees in most particulars with the figure and description referred to, but the carina of the lateral margin is much less distinct and high; and the larger hand differs in form.

As the specimen exceeds in size any of those measured by Mr. Smith, I think it possible that the differences referred to may be owing to the greater age of the individual; but as it may possibly prove to be a different species, I append a description of the chelipeds.

Merus and carpus as in *C. crassum*; larger hand short and broad, the depth exceeding the length of the superior margin. Propodal finger slender and straight, slightly spoon-shaped at extremity, with a large tooth near the

centre of its length, and several smaller teeth. Distal end of manus forming an angle of about 80° with the superior margin, and of about 60° with the propodal finger, which does not increase greatly in width towards its base. Dactylus slender with a large tooth nearer the base than the tip, which is inflated and spoon-shaped. Inner surface of the hand, towards the margins, armed with scattered tubercles of small size. Upper portion of manus curving inwards posteriorly, the carpus fitting, when the hand is bent, into the hollow between the upper incurved carina and lower thick portion of the manus. The smaller hand is similar to the larger. The stoutness of body of this crustacean is such that the sides of the branchial and hepatic regions are visible from above, and protrude laterally beyond the antero-lateral carina. The male appendages agree with those of *C. crassum*.

	M. M.
Greatest length of carapax, measured along its convexity.....	100
Greatest width of carapax.....	101
Length of larger hand to end of propodal finger.....	127
Length of larger hand from carpus to base of dactylus.....	40
Greatest width of larger hand.....	58
Width of carapax between antero-lateral carinae in front.....	93

If this should prove, on examination of more specimens, to be a new species, I propose to name it *Cardiosoma latimanus*.

Geocarcinus quadratus. De Saussure. Revue et Mag. de Zoöl., v., 360; pl. xii., f. 2.

The work above referred to is not accessible to me. In Mr. S. I. Smith's Notes on American Crustacea, Trans. Conn. Acad., vol. ii., *Cardiosoma quadratum*, Saussure, is referred to. Are they identical?

The male appendages of *C. quadratum* figured in the plate iv. of the notes cited above differ from those of the *Cardiosoma* described under *C. crassum*.

Mazatlan.

BOSCIADÆ.

Potamocarcinus armatus. M. Edwards. Archiv. du Mus., vii., 174; pl. xiii.

Obtained in the North Pacific Exploring Expedition in Lake Nicaragua. Stimpson. Prod. des Animal, evert, p. 46.

GRAPSIDÆ.

15. *Grapsus strigosus*. Latreille. Stimpson, Crust. & Echi., P. S. N. A., says: "Specimens in the Brit. Mus. from Lower California are referred to this species by White." White, Brit. Mus. Cat. Crust., p. 40.

Numerous specimens of a *Grapsus* from Lower California agree in every respect with the remarks upon this species in Dana's Crust. U. S. Ex. Exp., vol. 1, p. 338; having the merus of the right posterior legs three-toothed at its distal end, instead of entire, as in *G. pictus*.

No. 52. Mazatlan, dried. Henry Edwards.

No. 53. Locality unknown, dried. Donor unknown.

16. *Grapsus pictus*. De Saussure; Revue et Mag. de Zool., V., 362; Stimpson, Crust. & Echi., P. S. N. A., 26.

Stimpson doubts the identity of De Saussure's *G. pictus* with that of Latreille. I have as yet, among abundant specimens of crustacea from the east and west coast of Lower California, received but one species of *Grapsus*, and this does not agree, either in coloration or in the merus of the posterior legs, with the *G. pictus* described by Dana, Crust. U. S. Ex. Exp., 1, 337.

16. *Pseudograpsus*, { *Oregonensis*. Dana, U. S. Ex. Exp., Crust., 1, 334, pl.
Heterograpsus, } XX, f. 6; Milne Edwards, Melanges Carcinologiques,
 157; Stimpson, Proc. Cal. Sci., 1, 38.

No. 54. Three males, dried, S. F. Bay. Lockington.

No. 55. Several specimens, S. F. Bay. *Ibid*.

17. *Pseudograpsus*, { *Nudus*. Dana, U. S. Ex. Exp., Crust., 1, 335, pl. XX,
Heterograpsus, } fig. 7; Milne Edwards, *loc. cit.*, p. 159; Stimpson-
loc. cit., 1, 38.

No. 56. Several specimens, S. F. Bay. Lockington.

No. 57. Several specimens, Black Point, S. F. Bay. Lockington.

18. *Goniograpsus pulcher*. nov. sp.

Carapax with numerous transverse lines, not extending to the central regions. Sulcus between gastric and cardiac regions, very distinct. One antero-lateral tooth behind the post-orbital. Sides convergent posteriorly. Perpendicular portion of front about four times as long as high. Outer antennæ exert. Outer maxillipeds widely separated, narrow. Chelipeds subequal, merus triquetal, with the upper margin rounded, lower anterior ditto, produced into a wing-like keel, armed with about nine teeth on its edge; posterior margin toothed. Two or three teeth on the anterior edge of the ischium. Carpus with three teeth on its upper anterior angle. Manus broad and thin, smooth exteriorly, tubercular interiorly. Dactylus tubercular above. Upper surfaces of the merus crossed by transverse raised lines similar to those of the carapax. Carpus crossed, also, by rugæ, which show a tendency to split up into tubercles. Tubercles of manus arranged in longitudinal rows along its upper margin. Ambulatory legs, with the distal end of merus three-toothed, the upper tooth sharp, the two others long and rounded lobes; terminal joints with scattered hairs; dactyli spinose. Abdomen of the male with the two first joints very short, the third joint widest, and with strongly convex sides; remaining joints regularly diminishing in width, with a slight convexity. Color citrine, with a variable reticulation of dark brown, the ground becoming yellowish upon the legs. Chelipeds bright red.

Several specimens of both sexes from Magdalena Bay, west coast, Lower California.

The measurements of two average-sized specimens are as follows:

	♂	♀
Greatest length of carapax.....	40	30
Greatest width of ditto.....	43	34

The branchial regions are much elevated in old specimens.

I have preferred to employ Dana's name of *Goniograpsus* in preference to Randall's *Pachygrapsus*, as the generic characters given by the former author are the more precise and definite.

This species appears to be very near to the *Goniopsis cruentatus* of De Haan, but that species has the hand, carpus, and dactylus small spinulose above.

No. 58. Magdalena Bay, in spirits. W. J. Fisher.

19. *Pachygrapsus* (*Goniograpsus*) *crassipes*. Randall, Jour. Acad. Nat. Sci., Phil., VIII, 137; Stimpson, Crust. & Echi., P. S. N. A., 27.

No. 59. Several specimens, S. F. Bay. W. N. Lockington.

20. *Goniograpsus* (*Pachygrapsus*) *transversus*. Gibbs, Amer. Asso. Adv. Sci., 1850, p. 181; Stimpson, Ann. Lyc. Nat. Hist., N. Y., vol. VII, p. 64; S. I. Smith, Rep. Peabody Acad. Sci., 1869, p. 91.

The last named writer mentions specimens from Havana, the Gulf of Fonseca, and other points of the Pacific coast.

I have not seen either the species or a description of it, and therefore cannot be certain that the species just described may not be identical with it; but if so, the name *transversus* is very inapplicable.

21. *Glyptograpsus impressus*. S. I. Smith, Trans. Conn. Acad., vol. II, p. 154. Acapulco, west coast, Central America.

32. *Goniopsis cruentatus*. De Haven; S. I. Smith, Rep. Peabody Acad. Sci., 1869, 91.

23. *Sesarma sulcata*. S. I. Smith, Trans. Conn. Acad., loc. cit. p. 156. Corinto, W. coast Nicaragua.

24. *Sesarma occidentalis*. S. I. Smith, loc. cit. p. 158. Acapulco, W. coast Central America.

25. *Sesarma angusta*. S. I. Smith, loc. cit. p. 159. Pearl Islands, Bay of Panama.

26. *Aratus Pisoni*? M. Edwds, Ann. Sci. Nat. 3d ser., 1853, tome XX, p. 187. Hist. Nat. des Crust. II, p. 76, pl. 19, f. 45.

"A specimen from Corinto, Nicaragua, appears to belong to this species, but it has not been carefully compared with east coast specimens." S. I. Smith, Rep. Peabody Acad. Sci., 1869, p. 92.

GONOPLACIDÆ.

27. *Prionoplax ciliatus*. S. I. Smith. Panama.

Prionoplax spinicarpus. M. Edwds., Ann. des Sci. Nat., 3d series, XVIII, 161. *Ibid.* Archives du Mus. d'Hist. Nat., VII, 167, Pl. VI, f. 3.
Stimpson, Notes on N. Amer. Crust., 13.

28. *Euryplax politus*. S. I. Smith.
Panama.

29. *Glyptoplax puppax*. S. I. Smith.
Panama.

30. *Eucrate Californiensis*. Lockington, Proc. Cal. Acad. Sci., Feb. 7, 1876.
No. 61. San Diego, (Hy. Hemphill), dried.

This species is certainly neither of the preceding, but appears to closely resemble Stimpson's *Speocarcinus Carolinensis*.

PINNOTHERIDÆ.

31. *Pinnotheres faba*. Dana, U. S. Ex. Exp., 1, 381, pl. 24, fig. 4. *Pinnixa faba*. Stimpson, Crust. and Echi., P. S. N. A., p. 30.

Found in the large Lutraria of the Oregon coast.

32. *Pinnotheres margarita*. S. I. Smith, Trans. Com. Acad., Vol. II, p. 166,
Verrill, Amer. Nat., III, 245.

Two females of this species was brought by Mr. W. J. Fisher from Mulege Bay, Gulf of California.

"Everywhere covered, except the dactylus of the right ambulatory leg of of the second pair in the female, and tips of the others in both sexes with a very short and close, clay-colored pubescence, much like a uniform coating of mud."

Found in the pearl oyster, *Margaritophora fimbriata*.

A new species of *Pontonia* (*P. margarita*, Lockington,) is mentioned by Mr. Fisher as having been taken from *Margaritana margaritifera*, at Port Escondido, Gulf of California, but as Mr. Fisher's collections were almost exclusively marine, it is not unlikely that the above mentioned mollusk was the one he meant to indicate.

33. *Pinnotheres lithodomi*. S. I. Smith, Trans. Conn. Acad., loc. cit.
From *Lithodomus aristatus*, Pearl Islands, Panama.

34. *Pinnotheres angelica*. nov. sp.

Carapax smooth and shining, soft and slippery, without sutures, (when undried) somewhat transverse. External maxillipeds widely divaricate posteriorly; the third joint shaped like a boomerang, the external convex margin more curved than the concave internal margin; distal extremity rounded and ciliate on its internal edge, terminal joints ciliate. Chelipeds smooth, cylindrical, save that the manus is somewhat compressed distally; dactylus short, about half as long as the posterior part of the propodus, and equal in length to the propodal finger; both fingers hooked at the end, without teeth on their

internal borders. Ambulatory legs slender, cylindrical, smooth, dactylus of first pair short, that of second pair about as long as the propodus; those of third and fourth pairs equal in size, rather larger than that of first pair and about half as long as the propodi; that of fourth pair ciliate on its internal margin. Abdomen very large, wider than the carapax and covering the maxillipeds and even the eyes, when folded.

Several specimens, all females, were collected at Angeles Bay, Gulf of California, September, 1876, "in oysters."

	♂ M. M.	♀ M. M.
Length of carapax.....	11.5	9
Width of carapax	15	12
Breadth of abdomen.....	16.5	13.5

Many of the specimens are loaded with ova.

35. *Fabia subquadrata*. Dana, U. S. Ex. Exp., I, 882, pl. 24, fig 5. Stimpson, Crust. & Echi. P. S. N. A., 30.

Puget Sound. Farallone Islands.

- No. 83. In spirits, from mantle of *Pachydesma crassitelloides*. San Diego, (Hy. Hemphill.)

36. *Dissodactylus nitidus*. S. I. Smith, Trans. Conn. Acad. Sci., 1869, 173. Panama. Gulf of California. (Fisher.)

Two females from the latter locality have the peculiar bifurcate dactyli, from which Mr. S. I. Smith has named the genus *Dissodactylus*, and probably belong to *D. nitidus*, of which that author describes the male. The carapax is firm, somewhat wider at the lateral angles than posteriorly; convex in front and at the margins, without any upturned border along the antero-lateral margin, but with a short fissure extending obliquely inwards immediately anterior to the lateral angle. The posterior margin has an upturned border. There is no pubescent tuft on the inferior edge of the propodal finger. The ambulatory legs are as in the male. The abdomen resembles that of *Pinnotheres*, the terminal article reaching and partly covering the buccal frame. The prevailing color is dark purplish brown, with spots of white upon the carapax, and a ring of white at each joint of the limbs. The dactyli are white.

37. *Pinnixa* ? *nitida*. nov. sp.

Male. Carapax exceedingly transverse, smooth, shining, color in spirits, bright orange; all the limbs smooth and shining, without pubescence, of a straw yellow color. Maxillipeds very small and triangular, closely fitted to the buccal area, smooth and shining, as is also the sternum. Abdomen narrow at base, second segment rapidly widening, third widest, fourth, fifth and sixth tapering rapidly, seventh almost as long as wide, triangular, with the apex rounded. The abdomen does not cover more than one-half the sternal area. Chelipeds shorter than either second or third pair, the manus broad, with two setose ridges on its anterior surface, fingers short, hooked, toothless, movable finger oblique. Three last joints of ambulatory limbs flattened, carpus broad at distal extremity, scarcely longer than wide; propodus nearly twice as long as wide; dactylus slender, cylindrical, white, ending in a sharp yellow claw. Margins of last three joints setose, second pair (first ambulatory pair)

longer than the third, which are themselves longer than the chelipeds, fourth pair shorter, fifth very short.

	M. M.
Width of carapax	11
Length of carapax	5

Female. Carapax broadly transverse, smooth, shining, margins curved, angles rounded. Outer maxillipeds much larger than in the male just described, parallel, tomentose. Chelipeds shorter than fourth pair, hand short and rounded, wider than thick, tomentose, propodal finger short, hooked, dactylus oblique, hooked, toothless. Merus, carpus and propodus of all the ambulatory limbs greatly compressed; propodus as long as wide; carpus nearly twice as long as wide; dactylus short, cylindrical, ending in a sharp claw. Abdomen broad, covering the whole sternum, and fringed with long hairs round its margin. The pubescence of the chelipeds is continued along the fingers nearly to their tips, and is found also on the external portions of the carpus and flattened joints of the ambulatory limbs, as well as on the hepatic region. The color, where free from pubescence, is a brownish yellow (in spirits).

	M. M.
Length of carapax	7.5
Width of carapax	14

A single specimen of each the two crustaceans just described was collected on the same day at the same locality, namely, Angeles Bay, Gulf of California, and the two were placed by the collector (Mr. W. J. Fisher) in the same phial. Had it not been for this, I should certainly have never linked together two specimens so distinct in the relative proportions of the limbs themselves, as well as of the joints of those limbs; one covered in many places with an abundant pubescence, the other smooth and shining above and below. The proportions of the ambulatory limbs in the female agree with the genus *Pinnixa*, but in the male the increase of size is transferred to the second pair. Should these crustacea prove to be distinct the female should be *Pinnixa tomentosa*, while the male must be placed in some other genus.

I have no means of ascertaining upon what species of invertebrate animal these crustacea resided as commensals.

38. *Pinnixa longipes*. (*Tubicola longipes*. Lockington, Proc. Cal. Acad. Sci., April 17, 1876.)

This species should properly be placed in the genus *Pinnixa*. It possesses the characters of transverse carapax, and elongated fourth pair, in an extraordinary degree.

No. 60. Tomales Bay. (Lockington.) in spirits.

When I wrote the description of this species, I was not aware that any species of *Pinnothera* had previously been found quartered upon a worm, but I have since found that Stimpson (Notes on N. Amer. Crust., 21, 23) mentions two species, both belonging to this genus, that live in similar localities.

These species are, *P. cylindrica*, which inhabits the tube of the *Chaetopterus*, of South Carolina, and *P. lavigata*, which lives with the lobworm, *Arenicola cristata*, in its hole, not lined by any tube, in the sand.



